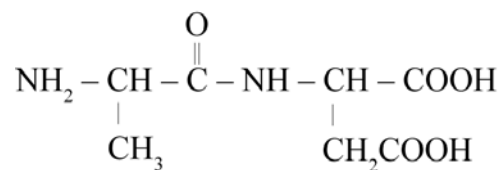


## Carboxylic Acids, Amides and Acid Chlorides

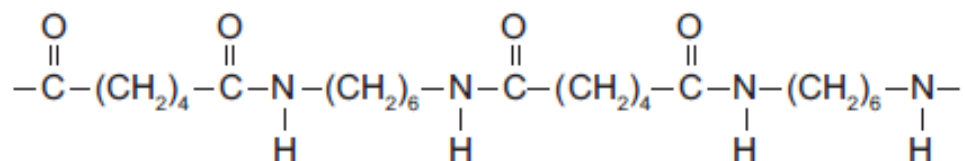
1) Determine the products of hydrolysis of the molecule shown below in BOTH acidic and basic conditions. Justify your answer in terms of structure and reactivity.



2) a) Give equations for the reactions of ethanamide when hydrolysed under acidic and basic conditions.

b) The haloalkane 1-chlorobutane can be used to make butanamide. One of the intermediate products is a carboxylic acid. Show, using structural formulae, how this might be achieved in a number of reaction steps. Include all reagents.

3) a) Nylon 6,6 is a polymer with the following structure:



Circle an amide linkage in the structure above.

4)

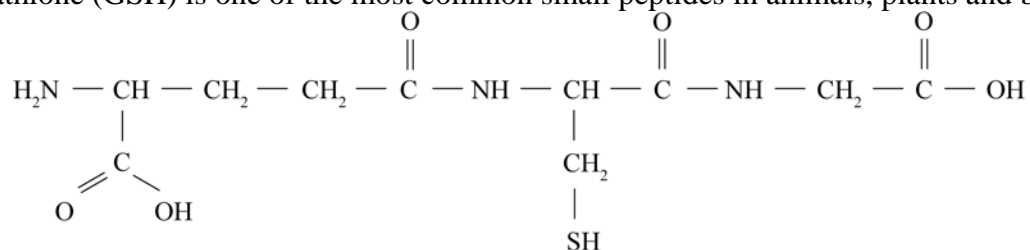
$\begin{array}{c} \text{O} \\ \parallel \\ \text{FH}_2\text{C}-\text{C} \\   \\ \text{OH} \end{array}$	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{C}-\text{CH}_2-\text{C} \\   \\ \text{Cl} \end{array}$
$\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{Br}$	$\begin{array}{c} \text{H}_3\text{C}-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3 \\ \parallel \\ \text{O} \end{array}$

i) Using a compound from the table above write an equation to show the formation of an amide.

**ii)** Using another compound from the table above write an equation to show the formation of an amine.

**iii)** Describe a test that could distinguish between the two organic products produced in reactions (i) and (ii).

**6) a)** Gluthathione (GSH) is one of the most common small peptides in animals, plants and bacteria.



**i)** Draw a circle around one of the amide (peptide) groups.

**ii)** Draw structures of the products of the hydrolysis of this compound using alkaline conditions (NaOH) **and** compare with the structures of the hydrolysis products under acidic conditions.